DEPARTMENT OF CHEMISTRY AND CHEMICAL ENGINEERING

ANNUAL REPORT

1953-1954

Enrollment

A comparison of the enrollment in chemistry and chemical engineering for 1951-1952, 1952-1953 and 1953-1954 is given in the accompanying table.

Total registration in chemistry courses:

I Sem. 1951-52	3606	I Sem. 1952-53	3814	I Sem. 1953-54	4006
II Sem. 1951-52	3186	II Sem. 1952-53	3411	II Sem. 1953-54	3309
	6792		7225		7315

Registration in freshman courses:

I Sem. 1951-52	1140	I Sem. 1952-53	1521	I Sem. 1953-54	1611
II Sem. 1951-52	936	II Sem. 1952-53	1245	II Sem. 1953-54	1288
	2076		2766		2899

Graduate students:

I Sem. 1951-52	276	I Sem. 1952-53	265	I Sem. 1953-54	267
II Sem. 1951-52	268	II Sem. 1952-53	258	II Sem. 1953-54	260
	544		523		527

Students in chemistry curriculum:

I Sem. 1951-52	169	I Sem. 1952-53	158	I Sem. 1953-54	146
II Sem. 1951-52	136	II Sem. 1952-53	129	II Sem. 1953-54	114
	305		287		260

Students in chemical engineering curriculum:

I Sem. 1951-52	197	I Sem. 1952-53	214	I Sem. 1953-54	219
II Sem. 1951-52	155	II Sem. 1952-53	166	II Sem. 1953-54	160
	352		380		379

The increase in total registration in chemistry courses in the past three years is probably indicative of a trend which will continue for several years.

The number of graduates is about the same as last year and lower than the previous two years. This may be explained in part by the draft and in part by the fact that there have been fewer B.S. students in chemistry and chemical engineering in most of the institutions of the country. The drop in graduate students at Illinois has been much less than at other institutions. The freshmen increased by 133 over last year.

The quality of the undergraduate and graduate students in chemistry and chemical engineering compares favorably with that of students in other post-war years.

No major changes have been made in the general programs of the Department of Chemistry and Chemical Engineering.

Operational costs have been kept to a minimum, but with an additional decrease in appropriations it has been very difficult to balance the budget. We have used funds made available by donors of industrial fellowships to the extent of over $30,000 this year as a supplement to university appropriations. Supplies for teaching and research have been restricted during the year. The University is now providing the department with $10,000 less for equipment and $18,000 less for operations than it did in 1951-52.

The repairs in Noyes Laboratory have been completed and teaching and research has thus been made much more effective. Inspection and repairs of air-conditioning equipment have been more satisfactory than in previous years.

Applications from foreign students to come to the University of Illinois, both as graduates and as postdoctoral research men, have increased. In general, these students require financial help which is not available for them. The foreign countries now represented in

graduate or postdoctorate work in chemistry are England, Finland, Switzerland, France, Turkey, Greece, Armenia, China, Formosa, Germany, Austria, Japan, India, Korea, Mexico and Canada. Among the undergraduates many other foreign countries are represented.

Foreign visitors have been numerous and without exception have been impressed with the teaching and research facilities at the University of Illinois.

The specialization of graduate students for 1952-53 and 1953-54 is shown in the following table.

Graduate Students

	1952-53	1953-54
Analytical	26	24
Biochemistry	33	29
Chemical Engineering	31	31
Inorganic	26	31
Organic	100	107
Physical	35	35
Unclassified (undecided as yet)	7	3
	258	260

Funds Contributed to the Chemistry Department by the Graduate College and Outside Sources

The fellowships received from the University and from industrial concerns are a very important factor in the success of the Department of Chemistry and Chemical Engineering. With these grants, a careful selection of the best qualified students for the Ph.D. degree can be made. Thirty-one postdoctorate research assistants were hired or have come to the University on fellowships during the current

year. This group is well-trained and such men are able to assist in the solution of the more difficult research problems.

The industrial fellowships are essentially unrestricted as to problems and in many cases unrestricted as to the general field of specialization of the incumbent. The stipends range from $1,200 to $1,700 for half-time appointees and usually provide a few hundred dollars extra for apparatus, chemicals and services. A few offer an additional amount to a married Fellow.

The duPont Company has provided $15,000 a year to the Department of Chemistry and Chemical Engineering to be spent for promotion of research in any way deemed best. This same company provides a $2,400 half-time assistantship appointment for a capable student in his third year of teaching.

Several institutional and governmental grants have also been accepted where the problems fall within a field of special interest to the staff member. There is only one small contract on "restricted" work and this will terminate in June.

Funds received are listed below in different categories.

Graduate Research Board

for equipment, research assistants, etc.....$28,857.00

University Fellowships

first, second, third year and post-doctorate..... 22,400.00

University Fellowships

indirect cost funds..... 6,500.00

Industrial Fellowships and Assistantships

including funds for equipment, etc..... 132,740.00

Government Contracts

Navy Contracts

T.O. XXVI - (Gutowsky)..... 17,000.00
Contract No. N-ONR-219(00) - (Laitinen)..... 6,500.00
Contract No. N6-ori-07136 (Bailar)..... 8,550.00
Contract No. ONR-07147 (Bailar)..... 2,867.00

Ordnance Department Contracts

Contract #DA-11-022-ORD-33 (Audrieth)..... 5,000.00
Contract #DA-11-022-ORD-828 (Audrieth)..... 40,000.00

Atomic Energy Commission

Contract No. AT(11-1)-67, Project #4 (Yankwich).....19,968.00
Contract No. AT(11-1)-67, Project #5 (Drickamer)... 19,090.00

Rubber Reserve

Contract RuR-SR-95, Reconstruction Finance Corporation (Marvel).....140,000.00

National Bureau of Standards

CST-1369 (Laitinen)..... 7,500.00

National Cancer Institute (Taylor)..... 8,534.00

American Philosophical Society (Ray)..... 2,000.00

Department of the Army

Contract - Chemical Corps 494 (Carter).....12,742.00
Office of the Surgeon General DA-49-007-MD-351, O.I. No. 6-53 (Snyder)..... 5,136.00

U. S. Public Health

Project USPHS-C-1856 (Vestling)..... 9,965.00
Project USPHS-B-574 (Carter)..... 9,995.00
Project USPHS-G-4118 (Carter and Gottlieb).....15,168.00

National Science Foundation Research Grant

NSF-G-280 (Bailar)..... 5,000.00
NSF-G-135 (Snyder)..... 9,500.00
NSF-G-484 (Ray)..... 5,300.00
NSF-G-465 (Taylor)..... 2,527.00

Research Corporation, (Bailar)..... 2,000.00

Research Corporation, Transference Numbers (Ray)..... 3,600.00

Guggenheim Foundation.....15,000.00

TOTAL GOVERNMENT, SPECIAL UNIVERSITY, AND OTHER FUNDS 1953-54...$563,439.00

A list of the industrial companies which have granted fellowships or research assistantships to the Department of Chemistry and Chemical Engineering follows. Each has donated adequate funds for one fellowship unless otherwise specified as well as money for the tuition of the recipient and usually a few hundred dollars for chemicals and equipment.

Allied Chemical and Dye Corporation - 2 fellowships

American Cyanamid

Armour and Company

Berasworth Chemical Company

Cincinnati Chemical Works

Colgate-Palmolive-Peet Company

Dow Chemical Company - 3 fellowships

E. I. duPont de Nemours and Company - 1 fellowship, 1 postgraduate fellowship and $15,000 Grant-in-Aid

Eastman Kodak Company

Eli Lilly and Company

Ethyl Corporation

Firestone Tire and Rubber Company

General Aniline and Film Company

General Electric Company

Lindsay Light and Chemical Company

Merck and Company

Minnesota Mining and Manufacturing Company - 2 fellowships

Monsanto Chemical Company

Pan American Refining

Parke, Davis and Company - 3 fellowships

Pittsburgh Consolidation Coal Company

Proctor and Gamble Company

Rohn and Haas

G. D. Searle and Company

Shell Oil Company

Sinclair Oil Refining

Socony-Vacuum Laboratories

Standard Oil Company of California

Standard Oil Company of Indiana

Standard Oil Company of Ohio

Texas Gulf Sulphur Company

U. S. Rubber Company

Victor Chemical Works

Visking Corporation - 2 fellowships

Western Cartridge Company

The Upjohn Company - 2 fellowships

Scientific Research and Publications

The following table indicates the number of scientific articles published by the chemistry faculty for the last few calendar years.

	No. of Articles		No. of Articles
1950	167	1952	181
1951	144	1953	195

The high level of productivity may be expected to continue. A list

of the titles of the articles published by the chemistry staff members during the calendar year 1953 is appended to this report.

Placement of Chemists and Chemical Engineers

A comparison of the number of chemists and chemical engineers graduating with the bachelor's and doctor's degrees in the calendar years 1952 and 1953 and the estimated number in 1954 is given below. The demand for men trained in chemistry and chemical engineering continues. Since last fall over 160 concerns have had their representatives in Urbana looking for chemists or chemical engineers. Beginning salaries for green Ph.D.'s in industry this year range from $6,600 to $7,200.

Ph.D. Degrees in Chemistry and Chemical Engineering

Calendar year 1952 - 69

Calendar year 1953 - 84

Calendar year 1954 - 70 (estimated)

B. S. Degrees in Chemical Engineering

	1952	1953	1954
February	11	14	19
June	23	18	18 (estimated)
August	$\frac{3}{35}$	$\frac{4}{36}$	$\frac{5}{42}$ (estimated)

B.A. or B.S. Degrees in Chemistry

	1952	1953	1954
February	11	6	9
June	33	30	25 (estimated)
August	$\frac{5}{49}$	$\frac{4}{40}$	$\frac{2}{36}$ (estimated

B.A. or B.S. Degrees LAS (Chemistry Majors)

	1952	1953	1954
February	13	7	14
June	46	33	32 (estimated)
August	$\frac{1}{60}$	$\frac{2}{42}$	$\frac{2}{48}$ (estimated)

Changes in Departmental Administration

On September 1, 1953 four of the division heads in the department were appointed as research professors. They will maintain the same teaching duties as in previous years and younger men have been assigned their administrative activities. The changes were as follows: W. H. Rodebush replaced by F. T. Wall in physical chemistry; G. L. Clark replaced by H. A. Laitinen in analytical chemistry; C. S. Marvel replaced by N. J. Leonard in organic chemistry; W. C. Rose replaced by H. E. Carter in biochemistry. H. F. Johnstone in chemical engineering and J. C. Bailar, Jr. in inorganic chemistry will continue as heads of their respective divisions.

Roger Adams requested and was granted as of September 1, 1953 change in status from professor of organic chemistry and head of the department of chemistry and chemical engineering to research professor and head of the department. On September 1, 1954, he requested appointment merely as research professor and this was approved. A committee composed of R. E. Johnson (Chairman), M. M. Rhoades, G. M. Almy, W. H. Rodebush, C. S. Marvel, G. L. Clark, W. C. Rose conferred with members of the present chemistry and chemical engineering staff and recommended unanimously to the Executive Committee of the Liberal Arts College that H. E. Carter be appointed

head of the department of chemistry and chemical engineering as of September 1, 1954. This was approved. Search for a replacement of H. E. Carter as head of the division of biochemistry is now under way.

Mrs. B. S. Hopkins was retained on temporary appointment for the academic year 1953-54. Two new instructors for inorganic chemistry were also appointed to fill vacancies in inorganic chemistry; they were Dr. Mark Jones and Dr. W. L. Masterton. On February 1, 1954, the one additional vacancy in inorganic chemistry was filled by Dr. Edward Alperovitch.

Dr. Joseph Larner was employed as assistant professor as of September 1, 1953 to provide for the additional instructional load in biochemistry.

The replacement of Miss Helen Miklas, spectroscopist, by Mr. James J. Brader, Jr. and Mrs. Rosemary Hill, spectroscopist, by Mrs. Beverly M. Thomas were two other changes in the department occurring last year.

STAFF HONORS AND ACTIVITIES

More signigicant scientific activities outside the University of staff members since last year and not mentioned in the previous departmental report follow.

Roger Adams

Midwest Medal Award. November 1953
Perkin Medal of the Society of Chemical Industry 1954.
Elected Trustee Battelle Memorial Institute, Columbus, Ohio.
Elected Trustee, Teachers Insurance and Annuity Association

J. C. Bailar, Jr.

Elected member - Council Committee on National Affairs and Divisional Activities, American Chemical Society.

Virginia Bartow

Elected - Chairman of the Division of History of Chemistry, American Chemical Society.

G. L. Clark

Elected to Phi Beta Kappa Associates.
Reelected to Highway Research Board, National Research Council.

D. Y. Curtin

Invited speaker - National Organic Chemistry Symposium of the American Chemical Society, Ann Arbor, Michigan.

R. C. Fuson

Invited speaker - Conference on Undergraduate Research in Chemistry sponsored by the National Science Foundation.

H. A. Laitinen

Elected Secretary of Commission on Electrochemical Data, Analytical Section of the International Union of Pure and Applied Chemistry.
Elected member, Chemistry Advisory Committee, Office of Scientific Research, Air Research Development Command.
Awarded John Simon Guggenheim Memorial Foundation Fellowship, July 1 - December 31, 1953.

N. J. Leonard

Invited speaker - Seminar on Natural Products, University of New Brunswick, Canada.
Invited speaker - Biennial Symposium of the Division of Organic Chemistry, The Chemical Institute of Canada, McGill University.

C. S. Marvel

Visiting Lecturer - University of Washington, Seattle.
Speaker - Dedication of Venable Hall, University of North Carolina.
Appointed member - Advisory Committee to National Bureau of Standards.
Appointed Collaborator - Southern Utilization Research Branch, Southern Agricultural Laboratory.

G. F. Smith

Chairman, Analytical Division of the American Chemical Society, 1954.
Fisher Award in Analytical Chemistry, 1954.

E. C. Taylor, Jr.

Invited Speaker - Symposium on the Chemistry and Biology of Pteridines, London, England.

C. S. Vestling

Sabbatical leave - Accepted for study in Nobel Medical Institute, Stockholm, Sweden.